



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE BRYOLOGIST.

VOL. VII.

MAY, 1904.

No. 3.

THE PERISTOME, VI.

A. J. GROUT.

In *Funaria* the segments are formed by the thickening of the ventral or inner walls of the sixteen cells, instead of adjoining portions of two cells as in *Mnium*; hence in *Funaria* the segments are directly opposite the teeth instead of alternating with them (See BRYOLOGIST, V., p. 6). Moreover, the exterior surface of the segments consists of a single row of plates instead of a double row, as in *Mnium*; this last follows as a necessity from the position of the segments, but on the inner side of the peristomial layer of cells, instead of several irregular rows of cells there are just two rows, corresponding in position exactly to the two rows on the outside of the peristomial layer in *Mnium*, so that the inner face of the segments consists of a double row of plates like the outer surface of the teeth.

M. Philibert suggests that the inner peristome of *Bartramia* may be intermediate between these two types, for while the segments are carinate as in *Mnium*, they are split along the keel; if now the adjoining halves of each pair of segments were to be united, we should have a condition strongly resembling that in *Funaria*. As there is a basal membrane which does not split at all this hypothesis does not seem at all forced. In *Dicranum* and most of the *Aplolepideae* the outer side of the teeth consists of a single row of plates, like the segments in *Funaria*. The median line is the line of junction of the two rows of plates which form the inner side of the tooth. For these reasons and some others not so easily explained, Philibert has concluded that the peristome of the *Aplolepideae* is homologous with the inner peristome of the *Diplolepideae*. For this reason it seems objectionable to speak of the endostome.

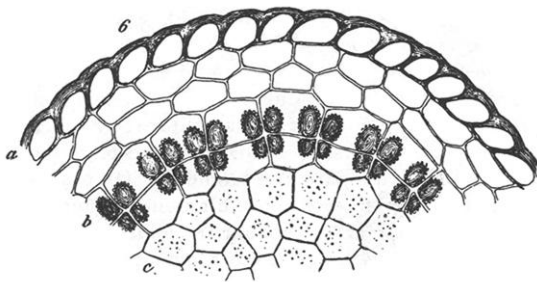


Fig 1.

another layer of sixteen cells, exactly matching the peristomial layer in position. The teeth are formed by thickenings in the four contiguous corners of this double row of cells. There are thus sixteen separate centers of deposit made up of four parts each. The thirty-two teeth of *Barbula* and *Tortula*

Philibert says:
"Mosses which have only a single row of plates on the dorsal surface of their teeth never have a double peristome."

In *Tortula subulata* (L.) Hedw. (Fig. 1,) the peristomial layer is bounded on its inner surface by

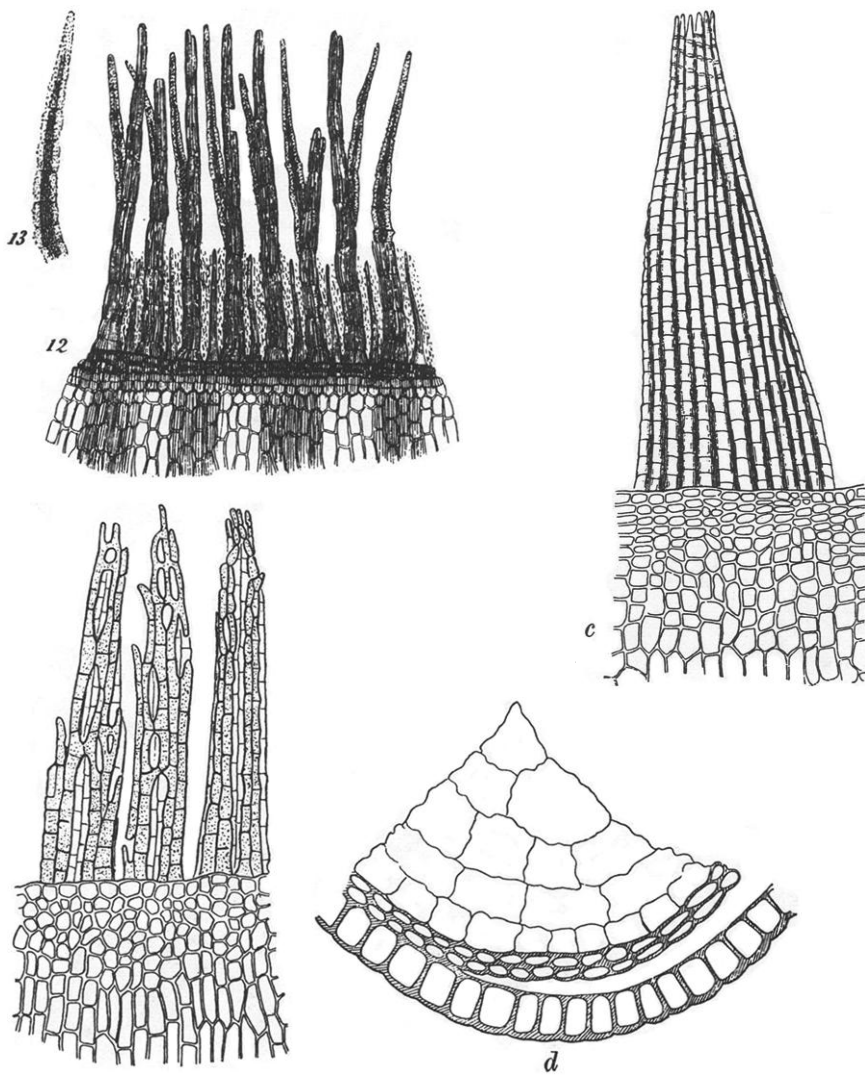


PLATE IV. Figs. 12 and 13. Peristome of *Encalypta procera*. Fig. c. Tooth of *Georgia pellucida*. d. Cross section of same. Lower left hand figure represents three teeth of *Encalypta longicolla*.

are made by the splitting in half radially of each of these sixteen bundles. The thickenings are thus all on the inner cell wall of the peristomial layer as is required by Philibert's hypothesis. He states that in the basal membrane of this *Tortula* the layer inside the peristomial layer consists of just twice as many rows of cells as appear in the region from which our figure is taken, thus making the homology with *Dicranum* and *Funaria* more complete.

Returning now to the relations between the arthrodont and nematodont types, M. Philibert considers *Encalypta* a primitive form connecting the two types and giving rise to all the varied kinds of arthrodont peristomes. In this connection I am very forcibly struck with the leaf resemblances between *Georgia*, *Webera*, *Encalypta* and the *Tortulaceae*, which last are evidently next of kin to *Encalypta* on the arthrodont side. Moss students will remember that so eminent an authority as Braithwaite places *Webera sessilis* next the *Tortulaceae* because of its leaf structure.

The leaves of *Buxbaumia* are so reduced as to be of little value in showing relationships, but the peristome shows undoubted affinity to that of some species of *Encalypta*. My studies on the peristome have convinced me that the following arrangement of families would more truly represent the order of evolution than the one I have previously followed: *Georgiaceae*, *Polytrichaceae*, *Buxbaumiaceae*, *Encalyptaceae*, *Tortulaceae*, *Ephemeraceae*, *Grimmiaceae*, *Dicranaceae*, *Fissidentaceae*.

In *Encalypta* we find a curious combination of peristome characters. The peculiar "extinguisher-like" calyptra and the leaf characters make it certain that no mistake is made in putting all the species into one genus, yet within the limits of this genus we have almost all degrees of completeness of the peristome from none at all in *E. commutata* to simple in *E. ciliata*, and highly developed and double in *E. procera*. The relationship to the Nematodont peristome is shown in *E. longicolla* and *E. brevicolla*, especially the former. Comparing the figures of the peristome of *Georgia pellucida* and those of the peristome of *E. longicolla* (Plate IV.) a most striking superficial resemblance appears, and this seems to increase rather than decrease upon closer investigation. The structure of the peristome of *Georgia* has previously been carefully explained, the only new points brought out are the thickening of the cell walls of the outer rows of cells. The peristome of *Encalypta longicolla* consists of sixteen lanceolate teeth, each composed of a bundle of jointed, red, papillose filaments. On the outer face of each tooth one can count four or five of these filaments, cohering at their joints but more or less free in the intervals between the joints, so that the tooth appears somewhat perforate. Sometimes these filaments are divided irregularly into two groups, separate at base but united at the top. These filaments contain cellular cavities as in *Georgia*, two in the middle and thickest portion of the tooth but usually only one on the edges. These cell cavities are enclosed by walls composed of two layers of plates, as are the teeth of the Arthrodontae. "To pass to the normal type of the Arthrodontae nothing is necessary but a reduction in the number of elements of

the peristome and a more complete and regular separation of its parts. The number of the teeth, so variable in the *Buxbaumiaceae* and also in the *Polytrichaceae* is already reduced to sixteen in our *Encalypta*, but each of these yet contains several layers of cells in thickness and several rows in width." The gradual reduction to the normal type takes place almost before our eyes in the genus *Encalypta*. There are forms of *E. longicolla* in which there are but three filaments on the face of each tooth, and there is often only a single layer of internal cell cavities. The reduction becomes even more apparent in the closely related *E. brevicolla*.

In *E. apophysata* the peristome is composed of sixteen long and narrow teeth connivent in the form of a cone. Upon the dorsal face of each of these teeth are two rows of reddish or orange plates separated by a median line along which the tooth is sometimes perforate. In thickness there are ordinarily three layers, two in contact with each other and a third inside these and separated from them by narrow elongated cell cavities. This layer rarely extends the whole length of the teeth and may be present near the base only. It is easy to recognize on the one hand the homologies of this peristome with that of *E. longicolla* and on the other with the normal Arthrodont peristome. The two outer layers of united plates correspond to the two layers of plates in the teeth and the third corresponds to the inner peristome.

In *E. procera* (Plate IV. Fig. 12,) there is an external peristome of sixteen narrowly linear, much elongated teeth, but which in number and arrangement of plates is typical of the Arthrodont-Diplolepid external peristome, i. e., two rows of outer plates and one of inner plates. Directly inside these outer teeth are sixteen inner teeth. These inner teeth are a little shorter than the outer and are formed of an outer papillose layer of plates and an inner more strongly thickened layer. These inner teeth are united below into a basal membrane about one-fourth the entire height of the inner peristome; this membrane is also united to the outer teeth by unabsorbed radial walls as in *E. apophysata*. Alternating with the teeth are sixteen narrow processes which Philibert states to be homologous with the keels of the inner peristome of the Diplolepidae.

Comparing this peristome of *E. procera* with the typical peristome of the Diplolepidae as illustrated and explained in previous articles there will be little difficulty in recognizing the corresponding and homologous parts. In the later development in *Mnium* and *Hypnum* the reduction in the number of elements in the teeth has been followed by a great increase in the breadth of the remaining elements.

AN INTERESTING MOSS BOOK.

A. J. GROUT.

Mr. Wm. L. Sherwood, President of the New York Naturalists' Club, has in his library a copy of "Twenty Lessons on British Mosses," by Wm. Gardener, of Dundee, published by Longman, Brown, Green & Longmans, London, in 1847. It is an exceedingly interesting little volume and apparently rare as I have never before seen a copy, and do not remember ever having heard of the book.